

FAST-NEUTRON TOTAL AND SCATTERING CROSS SECTIONS OF ^{58}Ni ^a

by

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ABSTRACT

Neutron total cross sections of ^{58}Ni were measured at 25 keV intervals from 0.9 to 4.5 MeV with 50-100 keV resolutions. Attention was given to self-shielding corrections to the observed total cross sections. Differential elastic- and inelastic-scattering cross sections were measured at 50 keV intervals from 1.35 to 4.0 MeV with 50-100 keV resolutions. Inelastic excitation of levels at 1.458 ± 0.009 , 2.462 ± 0.010 , 2.791 ± 0.015 , 2.927 ± 0.012 and 3.059 ± 0.025 MeV was observed. The experimental results were interpreted in terms of optical-statistical and coupled-channels models. A spherical optical-statistical model was found generally descriptive of an energy-average of the experimental results. However, detailed considerations suggested significant contributions from direct-vibrational interactions, particularly associated with the excitation of the first $2+$ level.

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